

REMARKS

Entry of the foregoing, re-examination and reconsideration of the subject matter identified in caption, as amended, pursuant to and consistent with 37 C.F.R. §1.116, and in light of the remarks which follow, are respectfully requested.

By the present Amendment, claim 1 has been amended to recite that the olefin (co) polymer has a molecular weight distribution of 3 or smaller measured by gel permeation chromatography. Support for this amendment can be found in the specification at page 39, lines 18 to 21. Claims 1-3 and 5-14 remain pending in this application with claims 7-12 being withdrawn from consideration on the merits.

Claims 1-3, 5, 6, 13 and 14 were rejected under 35 U.S.C. §103(a) as obvious over U.S. Patent No. 5,436,305 to Alt et al and U.S. Patent No. 5,571,880 to Alt et al for the reasons set forth in paragraph (4) of the Office Action. It is apparent from page 3 of the Office Action that the Examiner is also relying on U.S. Patent Nos. 4,530,914 and 4,892,851 to Ewen et al in addition to the Alt et al '880 and '305 documents. Accordingly, the rejection is actually Alt et al '880 and '305 in view of Ewen et al '914 and '851. Reconsideration and withdrawal of this rejection are respectfully requested for at least the reasons which follow.

Alt et al '305 and '880 have similar disclosures. Both disclose ethylene polymers that are waxy, have a low molecular weight and are soluble in xylene. They disclose the polymerization of ethylene in the presence of 1,2-difluorenylethane zirconium dichloride catalyst and methylaluminoxane co-catalyst. The low molecular weight ethylene copolymer in Run 9 is a waxy material with an intrinsic viscosity of 0.41; note Table I in columns 13-14 of Alt et al '880 and columns 17-18 of Alt et al '305. However, neither of the cited references discloses olefin (co)polymer having a molecular distribution of 3 or smaller. It is disclosed

that the molecular distribution of the ethylene copolymer of Run 9 is 7.1 which is substantially above the distribution of 3 or lower as specified in present claim 1.

One significant reason for the difference in the molecular weight distribution is due to the different catalyst used. The catalyst used to prepare the ethylene copolymer in Run 9 of Alt et al '305 and '880 is a 1,2-difluorenylethane zirconium dichloride catalyst that is outside the scope of the presently claimed invention. Further, the polymerization temperature of Run 9 in Alt et al '305 and '880 is 70°C. If the polymerization temperature is increased to 150°C, polymerization activity significantly decreases. Applicants have previously conducted ethylene polymerization in the presence of 1,2-difluorenylethane zirconium dichloride catalyst and methylaluminoxane at a temperature of 150°C and a pressure of 3Mpa and obtained only trace polymer.

As such, neither of the cited Art et al references teaches the characteristic feature of the presently claimed process to use a specific catalyst as specified for preparation of a low molecular weight ethylene (co) polymer.

Turning to the Ewen et al references, the Office Action states on page 3 that the preferred polymerization temperature disclosed in Ewen et al '914 is in the range of about 50° to 160°C. However, Ewen et al '914 relates to the preparation of polymers having high molecular weight and a wide molecular weight distribution; thus, the objectives of this reference are totally different from the invention of the present application. The catalyst used in Ewen et al '914 is a titanium complex of non-bridged bis (cyclopentadienyl) and is significantly different from the present invention. Also, the minimum molecular weight (Mw) of the polymers prepared in Ewen et al '914 is 89,000 (Example 3). When converted, the intrinsic viscosity (η) of 1.8 d/g (*see* "Polymer Handbook, 4th edition (John Wiley, Inc.)") is clearly outside the scope of the present invention.

The Office Action states further that Ewen et al '851 discloses that the characteristics of the polymer produced can be controlled by varying the polymerization temperature; a higher temperature generally produces a less crystalline polymer with a low melting point. However, Ewen et al '851 does not disclose that the polymerization gives higher activity at higher temperatures. Thus, catalysts conventionally used for low molecular weight ethylene polymers have low polymerization activity at high temperatures and polymerization activity decreases when hydrogen is added to lower the molecular weight.

The inventive process of the present application is totally different from conventional technology in that it provides high polymerization activity at high temperatures, and gives a low molecular weight polymer without the addition of an excessive amount of hydrogen.

In view of the above, the §103(a) rejection over Alt et al '305 and Alt et al '880 in view of Ewen et al '914 and '851 should be reconsidered and withdrawn. Such action is earnestly solicited.

From the foregoing, further and favorable action in the form of a Notice of Allowance is believed to be next in order and such action is earnestly solicited. Entry of the present amendment is respectfully requested in view of the reliance on the Ewen et al Patents and the fact that the amendment raises no new issues and places this application in allowable condition.

If there are any questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at (703) 838-6683 at her earliest convenience.

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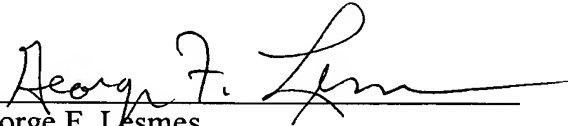
questions concerning this paper or the application in general, the Examiner is invited to telephone the undersigned at (703) 838-6683 at her earliest convenience.

Respectfully submitted,

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